The New Era of Maintenance Instructions

By Gunnery Sgt. Alex S. Thomason
Naval Safety Command

The New Era of Maintenance Instructions ///

As children, most of us were taught to read and write. Even before that, we were taught to follow instructions. We evolved from simply following instructions given verbally by a parent or teacher into reading instructions in our later years to follow a task, build something or repair something. Whether it was a direct instruction from one of our parents or a publication, following written instructions has been a factor in our lives. The knowledge in publications allows us to perform a task correctly and efficiently. At home, we sometimes avoid using instructions but often fail and must refer to them to complete whatever job we are working on. The same concept applies to our daily work practices in aviation maintenance. However, utilizing publications is far more critical in the aviation community, where adherence to our written instructions can be a matter of life and death. Although some tasks are less risky than others, failure is not acceptable, both with essential military equipment and when lives are on the line. As a result, aircraft, support equipment, and weapon systems are all governed by publications at various levels.

Aviation maintenance activities are responsible for using approved, up-to-date technical data to perform maintenance. Technical data management within COMNAVAIRFOR Instruction 4790.2D, Naval Aviation Maintenance Programs (NAMP) Chapter 10 Section 8, directs the requirements and responsibilities for managing the technical data held by maintenance activities at all levels. NAVAIR 00-25-100 is the governing policy document for the Naval Air Systems Command (NAVAIR) Technical Publications Library Management Program. Itprovides procedures related to technical manuals (TM) and Technical Publications Library (TPL) operations. Maintenance activities must inventory and verify the currency of the activity's technical data each year. Activities must demonstrate at least 50% of the technical data in the year's first six months and the remaining 50% in the last six months. The inventory can be broken into smaller segments, such as 10% each month or 25% each quarter, as long as the activity verifies all of the technical data it holds over the year. This information is a lot to manage, even if it is primarily electronic.

Most units have gone away from the legacy paper publications of the past. You could always find the most frequently used pages by their discoloration, and you had to know what you were looking for in the publications. Technology has played a vital role in the advancement of the technical libraries. Naval Air Technical Data and Engineering Service Center (NATEC) has streamlined this advancement with an online central repository of technical publications. The online central repository allows instant downloads of publications and all their updates. The repository also allows the program manager to catalog all unit technical publications in one location. The program manager can disperse the publications from this location to improve effective and safe maintenance.

One of those standard provisions is the portable electronic maintenance aid (PEMA), a computer with impact protection. Tough book computers have become the new commonplace tool that all maintainers use for their technical publications on the aircraft. You can fit all publications for a military occupational specialty on one PEMA. In most cases, an entire squadron's technical library is contained in every PEMA. These PEMAs are great, but they pose a foreign object debris hazard, especially if they are mistreated or not appropriately controlled. A common discrepancy across the fleet is loose or missing parts of the PEMAs. Technicians and collateral duty inspectors should thoroughly inspect PEMAs before starting a task, upon completion of each task and before entering or leaving the flight deck/flight line. If the Pema is missing parts or hardware, immediately inform the work center supervisor to prevent a potential

The New Era of Maintenance Instructions ⫻⫻

U.S. Army Capt. Benjamin Mcfarlin, an innovations officer assigned to Headquarters and Headquarters Battalion, 3rd Infantry Division, uses an augmented reality headset prototype during 3rd ID's Augmented Reality for Maintenance Training Executive Demonstration and Information Day, at Fort Stewart, Georgia, March 4, 2022. (U.S. Army photo by Sgt. Jose Escamilla)

foreign object damage event. New-era publication provisions have paved the way to even more advanced publications.

Technicians and mechanics at defense organizations worldwide now use virtual or augmented reality technology to manage various maintenance, repair, overhaul and inspection tasks. This new augmented reality makes military personnel more effective at operating military equipment, increases defense facilities compliance and improves the safety of operators. Implementing either augmented or virtual reality will help any maintainer troubleshoot, find the initial problem, get the part ordered or get the piece of equipment up and running promptly. The new technology may save maintenance hours and enable units to utilize this new technology to maximize maintenance time with minimal effort. Although there are numerous examples of military units using augmented reality technology to increase efficiency and effectiveness, the following are a few examples.

Marines and Sailors of the 4th Marine Logistics Group use augmented reality work instruction software to provide real-time start procedure instructions on their 30-kilowatt advanced medium mobile power source generator sets. This portable power source offers a full range of critical logistical support needed to keep the Marine Reserve Forces units fully combat operational.

U.S. Army personnel who perform maintenance on similar generators have implemented blended goggle technology, which is a mix of augmented and virtual reality to provide a visual aid for specialists. The goggles overlay virtual graphics, text, video and tools, which enable easier hands-free viewing of technical instructions than previous iterations. According to the U.S. Army, the mixed reality goggles answer queries regarding the generator's operating site while its software predicts related problems and guides users to appropriate troubleshooting steps.

U.S. Air Force jet engine technicians using augmented reality have completed 100% of 28

assigned tasks with zero errors. Automotive technicians in the New Zealand Army Trade Training School using augmented reality have completed tasks with 36% fewer errors than trainees using "legacy" traditional training methods, which included instructor assistance.

Publications govern our day-to-day lives as professional maintainers. Whether it be aviation, general support equipment or other specialties that require any form of maintenance, there must be publications to guide technicians through maintenance processes and procedures.

As time passes and technology advances, we will increase creative, time-saving ways to implement these publications into our lives. Augmented reality, PEMAs and virtual reality are just the beginning of the new era of publications.

A PEMA in use during MH-60R maintenance at HSM-70. Photo courtesy of NAVAIR.

Of course, instructions or publications, regardless of their method of dissemination, are only beneficial if followed. Unfortunately, while conducting NAVSAFECOM assessments, we commonly observe maintenance technicians not using technical publications. Just having the publication open or the PEMA turned on is insufficient. The intent is for these new, more informative and easier-to-use technologies to encourage all technicians to use publications to ensure "by-the-book" maintenance.

///

Cover: Aviation Electricians Mate Airman Johnathan Thomas, assigned to Patrol Squadron (VP) 4, uses a PEMA device to guide him in fixing electrical discrepancies on a P-8A Poseidon aircraft during a scheduled maintenance inspection. (U.S. Navy photo by Mass Communication Specialist 2nd Class Juan S. Sua)